CLAIMS

Claim 1. A method for manufacturing a nanostructured porous film electrode, the method characterized by the steps of:

- preparing a binder-free suspension (21) of electrode material particles (11) in a volatile suspending agent (13), said particles substantially having a size within the nanometer scale,
- depositing the binder-free particle suspension (21) on a substrate (22) covered with a conducting film,
- removing the suspending agent (31) by evaporation, and
- compressing the particles to form an electrically conducting and mechanically stable nanostructured porous film.

Claim 2. The method according to claim 1, characterized in that the step of preparing the suspension comprises the step of adding electrode material particles of a semi-conducting material to the suspending agent.

Claim 3 The method according to claim 2, characterized in that the step of adding electrode material particles of a semi-conducting material to the suspending agent comprises the step of selecting the semi-conducting material of the group consisting of TiO_2, ZnO, Nb_2O_5, ZrO_2 and SnO_2.

Claim 4. The method according to claim 2, characterized in that the electrode material added to the suspending agent consists of particles having a size substantially in the range of 10-100 nanometer, while a portion of up to about 1% by weight have a particle size in the range of 1-10 μm.

Claim 5. The method according to claim 2, characterized in that the

step of adding electrode material particles of a semi-conducting material to the volatile suspending agent comprises the step of selecting the suspending agent from the group consisting of ethanol, methanol, acetone and water.

Claim 6. The method according to claim 1, characterized in that the step of depositing the particle suspension on a substrate covered with a conducting film comprises the step of selecting the substrate material from the group consisting of glass and plastic.

Claim 7. The method according to claim 1, characterized in that the step of compressing the particles comprises the step of applying a pressure in the range of 100 to 1000 kg/cm^2 on the particles deposited on the conducting substrate.

Claim 8. The method according to claim 1, characterized in that the step of compressing the particles comprises the step of applying a pressure of 500 kg/cm^2 on the particles deposited on the conducting substrate.

Claim 9. The method according to claim 1, characterized in that the step of compressing the particles comprises the step of applying the pressure with a planar pressure tool.

Claim 10. The method according to claim 1, characterized in that the step of compressing the particles comprises the step of feeding a substrate between two cooperating pressure rollers, said pressure rollers providing the pressure necessary to form the electrically conducting and mechanically stable nanostructured porous film.

Claim 11. The method according to claim 9, characterized in that the step of compressing the particles comprises compressing with a tool being provided with a relief pattern, said pattern thereby being transferred to the nanostructured porous film produced during the compressing step.

Claim 12. The method according to claim 1, wherein said removing the suspended agent by evaporation step is performed subsequent to said depositing the binder-free suspension step and prior to any heating step.

Claim 13. The method according to claim 1, wherein the porous film has a porosity in the range of approximately 50-60%.

Claim 14. A method of manufacturing a nanostructured porous film electrode, comprising the steps of:

preparing a binder-free suspension of electrode material particles in a volatile suspending agent, said particles substantially having a size within the nanometer scale,

depositing the binder-free particle suspension on a substrate covered with a conducting film,

subsequent to said depositing step and prior to any heating step, removing the suspending agent by evaporation, thereby leaving a particle layer on said substrate and

compressing the particle layer to form an electrically conducting and mechanically stable nanostructured porous film.

Claim 15. The method according to claim 14, wherein the porous film has a porosity in the range of approximately 50-60%.

Claim 16. A method of manufacturing a nanostructured porous film electrode, comprising the steps of:

preparing a binder-free suspension of electrode material particles in a volatile suspending agent, said particles substantially having a size within the nanometer scale,

depositing the binder-free particle suspension on a substrate covered with a conducting film,

removing the suspending agent by evaporation, thereby leaving a particle layer on said substrate and

compressing the particle layer to form an electrically conducting and mechanically stable nanostructured porous film,

wherein all manufacturing steps between said depositing step and said compressing step are conducted at room temperature.

Claim 17. The method according to claim 16, wherein the porous film has a porosity in the range of approximately 50-60%.